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IS 7809-3-5 (1977): Pressure sensitive adhesive tapes for electrical purposes, Part 3: Specifications for individual materials, Section 5: Cellulosic paper with thermosetting adhesive [ETD 2: Solid Electrical Insulating Materials and Insulation Systems]



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IS : 7809 ( Part III/Sec 5 ) - 1977

*Indian Standard*

SPECIFICATION FOR  
PRESSURE SENSITIVE ADHESIVE TAPES  
FOR ELECTRICAL PURPOSES

PART III SPECIFICATIONS FOR INDIVIDUAL MATERIALS

Section 5 Cellulosic Paper With Thermosetting Adhesive

( First Reprint JUNE 1983 )

UDC 621.315.61.418 : 621.315.614.64



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INDIAN STANDARDS INSTITUTION  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# Indian Standard

## SPECIFICATION FOR PRESSURE SENSITIVE ADHESIVE TAPES FOR ELECTRICAL PURPOSES

### PART III SPECIFICATIONS FOR INDIVIDUAL MATERIALS

#### Section 5 Cellulosic Paper With Thermosetting Adhesive

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# *Indian Standard*

## SPECIFICATION FOR PRESSURE SENSITIVE ADHESIVE TAPES FOR ELECTRICAL PURPOSES

### PART III SPECIFICATIONS FOR INDIVIDUAL MATERIALS

#### Section 5 Cellulosic Paper With Thermosetting Adhesive

### 0. FOREWORD

**0.1** This Indian Standard ( Part III/Sec 5 ) was adopted by the Indian Standards Institution on 22 December 1977, after the draft finalized by the Electrical Insulation Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** A series of standards is being brought out on pressure sensitive adhesive tapes for electrical purposes. This series covers the following in various parts:

- a) General requirements,
- b) Methods of test, and
- c) Specifications for individual materials.

**0.3** This standard ( Part III/Sec 5 ) covers requirements for cellulosic paper tape with thermosetting adhesive.

**0.4** This standard should be read in conjunction with IS : 7809 ( Part I )-1975\* and IS : 7809 ( Part II )-1977†.

**0.5** In the preparation of this standard, assistance has been derived from IEC Doc: 15C ( Central Office ) 58 'Draft — Specification for pressure sensitive adhesive tapes for electrical purposes — Part 3: Sheet 5: Requirements for cellulosic paper with thermosetting adhesive', issued by the International Electrotechnical Commission.

**0.6** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960‡. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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\*Specification for pressure sensitive adhesive tapes for electrical purposes: Part I General requirements.

†Specification for pressure sensitive adhesive tapes for electrical purposes: Part II Methods of test.

‡Rules for rounding off numerical values ( revised ).

## **1. SCOPE**

**1.1** This standard ( Part III/Sec 5 ) covers requirements for pressure sensitive adhesive tapes made of cellulosic paper with thermosetting adhesive.

## **2. DESIGNATION**

**2.1** Designation of the product shall be in accordance with 3 of IS : 7809 ( Part I )-1975\*.

## **3. GENERAL REQUIREMENTS**

**3.1 General** — The material shall conform with the requirements specified in IS : 7809 ( Part I )-1975\*.

**3.2 Width** — The measured width shall be in accordance with 6.2 of IS : 7809 ( Part I )-1975\*.

**3.3 Length** — The measured length shall be in accordance with 6.3 of IS : 7809 ( Part I )-1975\*.

**3.4 Thickness** — The thickness shall be measured in accordance with 3 of IS : 7809 ( Part II )-1977†.

**3.4.1** The preferred nominal thickness shall be in the range 0.1 mm to 0.2 mm. The tolerance on the thickness shall be  $\pm 0.025$  mm.

## **4. PERFORMANCE REQUIREMENTS**

**4.1 Electrolytic Corrosion** — The electrolytic corrosion shall be measured in accordance with 4 of IS : 7809 ( Part II )-1977†.

The central value of the insulation resistance shall be at least  $10^7 \Omega$  after 24 hours exposure at  $27 \pm 2^\circ\text{C}$  and  $93 \pm 2$  percent relative humidity.

**4.2 Thermal Endurance** — When required by the purchaser, the supplier shall provide evidence that, when tested in accordance with 7 of IS : 7809 ( Part II )-1977†, the tape has a temperature index not less than  $105^\circ\text{C}$ . The ageing temperatures shall be  $120^\circ\text{C}$ ,  $140^\circ\text{C}$  and  $160^\circ\text{C}$ .

**4.2.1** The end-point criteria are:

- a) Breakdown voltage — 1.0 kV, and
- b) Loss of mass — 20 percent.

**4.2.2** The electrode for testing electric strength shall be a metal foil.

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\*Specification for pressure sensitive adhesive tapes for electrical purposes: Part I General requirements.

†Specification for pressure sensitive adhesive tapes for electrical purposes: Part II Methods of test.



### 4.3 Curing Properties

**4.3.1 Bond Separation During Thermal Treatment** — When tested in accordance with 8.3 of IS : 7809 ( Part II )-1977\*, the flagging shall not exceed 2 mm.

**4.3.2 Bond Separation After Thermal Treatment** — When tested in accordance with 8.2 of IS : 7809 ( Part II )-1977\*, all specimens shall pass the prescribed time of 20 minutes.

**4.4 Tensile Strength and Elongation at Break** — When tested in accordance with 9 of IS : 7809 ( Part II )-1977\*, the central value of tensile strength shall be at least 500 N/10 mm width for each millimetre thickness. The elongation at break shall be not less than 3 percent.

**4.5 Adhesion to Steel** — When tested in accordance with 10.3.2 of IS : 7809 ( Part II )-1977\*, the central value of the adhesion to steel shall be at least 3.0 N/10 mm width.

**4.6 Adhesion to Backing** — When tested in accordance with 10.3.3 of IS : 7809 ( Part II )-1977\*, the central value of the adhesion to backing shall be at least 2 N/10 mm width.

**4.7 Shear Adhesion to Backing After Liquid Immersion** — When tested in accordance with 12 of IS : 7809 ( Part II )-1977\*, using a mineral spirit with an aniline point between 50°C and 60°C, the central value of the shear adhesion after 10 hours immersion shall be at least 3 N/10 mm width.

**4.7.1** By agreement the effect of other solvents may be determined by the flagging test.

**4.8 Electric Strength** — When tested in accordance with 13 of IS : 7809 ( Part II )-1977\*, the central value of the electric strength at room temperature shall be not less than 8 kV/mm.

**4.9 Electric Strength After Humid Conditioning** — When tested in accordance with 14 of IS : 7809 ( Part II )-1977\*, the central value of the electric strength after 24 hours at  $27 \pm 2^\circ\text{C}$  and  $93 \pm 2$  percent relative humidity shall be not less than 6 kV/mm.

**4.10 Insulation Resistance** — When tested in accordance with IS : 2259-1963† the insulation resistance shall be equal to or greater than 250 M $\Omega$  in the as received condition.

**4.10.1** After subjecting the material to 95 to 100 percent relative humidity at 40°C for 24 hours the drop in insulation resistance value shall not be more than 10 percent after normalizing for 1 hour at  $27 \pm 2^\circ\text{C}$  and 50 to 60 percent relative humidity.

\*Specification for pressure sensitive adhesive tapes for electrical purposes: Part II Methods of test.

†Methods of test for determination of insulation resistance of solid insulating materials.

## IS : 7809 ( Part III/Sec 5 ) - 1977

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# INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

## Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	Pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

## INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

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### Regional Offices :

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Eastern : 5 Chowringhee Approach

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Gangotri Complex, Bhadbhada Road, T.T. Nagar

22E Kalpana Area

5-8-56C L.N. Gupta Marg

R 14 Yudhister Marg, C Scheme

117/418 B Sarvodaya Nagar

Patliputra Industrial Estate

Hantex Bldg (2nd Floor), Rly Station Road

	Telephone
BOMBAY 400007	89 65 28
CALCUTTA 700072	27 50 90
MADRAS 600020	41 24 42
S. A. S. NAGAR	8 78 26
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Printed at Today & Tomorrow's Printers & Publishers New Delhi India